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ABSTRACT

This report presents the responses of three experts from Canada, Mexico, and the United States to 18 questions concerning issues in business-higher education alliances in the context of the North American Free Trade Agreement (NAFTA). They address such issues as the need for alliances; the characteristics of successful (and unsuccessful) alliances; the progress in each country toward establishing alliances; the function of government agencies, professional associations, and community organizations in the formation of alliances; the role of technology in furthering alliances; the advantages of alliances; and the prospects for alliances in the future. The questions are grouped into three sections. In the first, responses to the seven questions about smart alliances produce several definitions of alliances, note various types of alliances, and define the characteristics of "smart" alliances. Responses to the five questions in the second section address what is needed for higher education institutions and business to develop successful alliances, and cover issues such as relationship management and the necessary people skills for alliance building. The six questions of the third section address the required framework for these partnerships to prosper, such as mechanisms for measuring the impact of alliances and prospects for binational and trinational collaboration in the context of NAFTA and the global economy. Appendices present reprints of two brief related articles. (DB)

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Understanding the Differences

A Working Paper Series on
Higher Education in Canada,
Mexico, and the United States

Working Paper #7

Teaming Up: Higher Education-Business Partnerships and Alliances in North America

by
Guillermo Fernández de la Garza
Bertha A. Landrum
Barbara Samuels

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- Assist policymakers in dealing with higher education and human resource issues through research and analysis,
- Foster cooperative planning, especially that which targets the sharing of resources.

In 1993, WICHE, working in partnership with the Mexican Association for International Education (AMPEI), developed the U.S.-Mexico Educational Interchange Project to facilitate educational interchange and the sharing of resources across the western region of the U.S. and with Mexico. In 1995, the project began a trinational focus which includes Canada, with the goal of fostering educational collaboration across North America. In 1997, the project changed its name to the "Consortium for North American Higher Education Collaboration" (CONAHEC). The "Understanding the Differences" series was developed as a resource for the initiative and was created under the direction of WICHE's Constituent Relations and Communications and Policy and Information Units.

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- Working Paper #4: *Higher Education's Responsiveness in Mexico and the United States to a New Economy and the Impacts of NAFTA* (Publication Number 2A264)
- Working Paper #5: *The Role of Technology in Higher Education in North America: Policy Implications* (Publication Number 2A291)
- Working Paper #6: *A Region in Transition: The U.S.-Mexico Borderlands and the Role of Higher Education* (Publication Number 2A305)
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- Comparative report: *Understanding the Differences: An Essay on Higher Education in Mexico and the United States* (Publication Number 2A265)

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"UNDERSTANDING THE DIFFERENCES"
A WORKING PAPER SERIES ON HIGHER EDUCATION IN MEXICO, THE UNITED STATES, AND CANADA

WORKING PAPER NO. 7

TEAMING UP:

HIGHER EDUCATION-BUSINESS PARTNERSHIPS AND ALLIANCES IN NORTH AMERICA

BY

GUILLERMO FERNÁNDEZ DE LA GARZA
BERTHA A. LANDRUM
BARBARA SAMUELS

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FOREWORD

The rapid globalization of the marketplace and new developments in technology are transforming political, economic, and social structures worldwide. One part of this larger process—NAFTA—poses new problems and possibilities for cooperation in North America. Within each of the NAFTA countries, collaborative undertakings between higher education institutions and the business sector have already created new structures and systems that have yielded significant results. Among the important outcomes of such alliances have been agricultural experiment stations and cooperative extension programs; contracts between corporations and community colleges; public policy institutes and research centers; and, business incubators.

Some collaborative efforts that cross borders are also under way, and, as Mexico, the United States, and Canada draw closer together economically, the opportunities for binational and trinational alliances are increasing. Within countries and between countries, higher education-business alliances promote the best use of resources, enabling participants to become more efficient, strategic, and innovative.

With these benefits in view, The Consortium for North American Higher Education (CONAHEC) has invited a trinational team of experts to develop this report. "Teaming Up: Higher Education-Business Partnerships and Alliances Within and Across Borders" is intended to give an overview of some of the major issues involved in business-higher education alliances. Responding to a wide-ranging series of questions (some narrowly focused, some vast in implication), three experts, one from each of the NAFTA countries, explore theoretical issues, analyze current trends, and reflect on looming possibilities. They address such issues as the need for alliances; the characteristics of successful (and unsuccessful) alliances; the progress in each country in establishing alliances; the function of government agencies, professional associations, and community organizations in the formation of alliances; the role of technology in furthering alliances; the advantages of alliances; and, the prospects for alliances in the future.

The experts responding to the questions are Guillermo Fernandez de la Garza, the Executive Director of the United-States Mexico Foundation for Science; Bertha A. Landrum, Director of Business and Workforce Development with the Maricopa Community College District; and, Dr. Barbara Samuels, Director of Planning at the University of Calgary. Their informed and thoughtful responses constitute the core of this report. A first rather than a final look at the issues surrounding higher education-business collaboration in the three countries, "Teaming Up" provides a starting place for all those interested in the future of alliances within and across borders.

"Teaming Up" is the seventh in a series of reports that analyze educational practice and policy in Canada, the United States, and Mexico. All have been designed to highlight both differences and similarities, with the goal of fostering educational collaboration across North America.

The series, entitled "Understanding the Differences," was initiated in 1994 in an effort to provide information on educational policy issues affecting Canada, Mexico and the United States, particularly in a comparative context. It was undertaken with the encouragement of The

Ford Foundation's Representative for the Office for Mexico and Central America, Norman Collins, and The Ford Foundation's Vice President of Education, Arts and Culture, Alison Bernstein. The series analyzes the major policy issues and differences in each country, to promote meaningful discussions among higher education leaders and policymakers. In 1995, the project began a trinational focus that includes Canada, with the goal of fostering educational collaboration across North America.

"Understanding the Differences" is an important component of the Consortium for North American Higher Education Collaboration (CONAHEC)—formerly the U.S.-Mexico Educational Interchange Project—an initiative developed to remove the obstacles to North American educational interchange and increase understanding and opportunities for collaboration in Mexico, Canada, and the United States. The Western Interstate Commission for Higher Education has combined its efforts with the Asociación Mexicana para la Educación Internacional, the University of Arizona, the Universidad Autónoma de Baja California, the University of British Columbia and the California State University System to achieve these objectives. The "Understanding the Differences" series includes:

- Working Paper #1: *Policy Approaches to Evaluation and Incentive Funding in U.S. and Mexican Higher Education*, by Peter Ewell and Rollin Kent.
- Working Paper #2: *Higher Education Faculty in Mexico and the United States: Characteristics and Policy Issues*, by Cheryl Lovell and Dolores Sánchez Soler.
- Working Paper #3: *The Educational Systems of Mexico and the United States: Prospects for Reform and Collaboration*, by JoAnn Canales, Leticia Calzada Gómez and Néllyda Villanueva.
- Working Paper #4: *Higher Education's Responsiveness in Mexico and the United States to a New Economy and the Impacts of NAFTA*, by Elizabeth Santillanez.
- Working Paper #5: *The Role of Technology in Higher Education in North America: Policy Implications*, by Glen Farrell, Sally Johnstone, and Patricio López del Puerto.
- Working Paper #6: *The BORDER PACT REPORT: A Region in Transition: The U.S.-Mexico Borderlands and the Role of Higher Education*, by Beatriz Calvo Pontón, Paul Ganster, Fernando León-García, and Francisco Marmolejo.
- The main comparative report: *Understanding the Differences: An Essay on Higher Education in Mexico and the United States*, by Judith I. Gill and Lilian Alvarez de Testa.

WICHE and CONAHEC thank Alison Bernstein, Janice Petrovich, and Norman Collins of The Ford Foundation for their generous support of CONAHEC and for their recognition of the importance of policy studies in North American higher education.

WICHE and CONAHEC also acknowledge the trinational team of authors of this working paper, who freely gave of their time to share their expertise with others. See "About the Authors" section for more information on the authors. The authors eagerly worked through

language barriers, cultural differences and logistical obstacles, in the spirit of true cross-border cooperation and exchange, which should characterize a project of this nature. We hope their cooperative efforts will inspire other researchers to pursue future binational and trinational collaborations.

This working paper was written to serve as a basis for the discussions of the November 3-5, 1997 North American Educational Leadership Seminar, hosted by the University of Guanajuato. The seminar was entitled "Business and Higher Education in North American: Creating New Alliances." We would also like to take this opportunity to thank the members of the 1997 Planning Committee for their many insights that helped form this paper. They include: Norman Wagner, Sally Brown, Larry Sproul, Alfredo Capote, Jocelyne Gacel, Alejandro Mungaray, Elvia Palomera, Juan Carlos Romero Hicks, Madeleine Green, Jaime Gutierrez, Dolores Sanchez Soler, and Al Zapanta.

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WICHE and CONAHEC hope that this series will foster improved understanding of significant higher education issues in Canada, Mexico, and the United States, and, over time, lead to new cooperative efforts to increase educational opportunities across North America.

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October 1997

I. SMART ALLIANCES

1. How do you define business higher education alliances in Canada, United States, and Mexico? Do partnerships differ from alliances? If so, how?

MEXICO (FERNANDEZ DE LA GARZA): A business-higher education alliance in Mexico can be defined as a joint commitment for both sides to cooperate to advance each other. Such an alliance works to improve the processes, products, or services of the business or industry and the educational goals and capacities of the university.

The number of partnerships between educational institutions and businesses is growing in Mexico. In 1994, there were 2,560 reported partnerships; by 1996 the number had risen to 4,861. The number of partnerships should continue to grow even further to contribute to Mexico's economic and social development. As these partnerships are created, strengthening strategic industries and fostering new opportunities, they must keep in view the general needs of Mexican society.

Links between business and higher education in Mexico have been forged without the assistance of any formal national institution or agency. Such an institutional mechanism could, however, be of great benefit. It could, for instance, facilitate the establishment of regional programs between universities and small- and medium-sized businesses. It could also coordinate the activities of businesses, state governments, industrial chambers, and research and educational institutions.

Yes, partnerships differ from alliances. Partnerships are short-term arrangements focused on immediate issues; they seek to solve specific problems with existing resources. Alliances are long-term connections focused on future problems; they seek to solve future problems by anticipating trends and developing new capabilities.

UNITED STATES (LANDRUM): Personally, my preference is to use the term "partnerships" rather than "alliances." Webster's dictionary defines "alliance" as "a close association for a common objective" or "any association entered into for mutual benefit." It defines "partnership" as "an association of two or more partners in a business enterprise." Thus, "partnership" suggests an entrepreneurial enterprise with shared risk, joint authority, and strong, equal commitment. "Alliance," on the other hand, seems to suggest less commitment—and therefore less assurance of achieving results. Furthermore, since "partnership" is a common business term, it announces that higher education and business are, in a sense, "in business" together.

CANADA (SAMUELS): There is general agreement that the primary goal of our society is to educate our young people for gainful employment and a fulfilling life. Eric Newall, Chairman, President, and CEO of Syncrude Canada has said: "By investing in skills and education, we will fulfill a vital obligation and meet the challenge of making sure our country will flourish long after we, as leaders, have given up the reins."

We also want our educational systems to explore new forms of cooperation and collaboration with a variety of business, government, and nonprofit enterprises to create sufficient wealth to increase our country's standard of living.

I prefer the term "alliance" to describe such collaborations. A conventional business term, "partnership" implies both risk sharing and profit-sharing. Educational institutions take risks with ideas, not money; they do not have the resources to take financial risks. Thus the term "partnership" does not fit the nature of their enterprise. "Alliance," on the other hand, defines a union or confederation—a community. An "alliance" recognizes the differences between the parties involved, respects their separate priorities, and yet defines their commitment to work together.

An alliance seems to be the most useful model for cooperation between educational institutions and businesses. But as we seek to establish such alliances, we need to consider what makes some work and others fail. We need to create not just alliances but *smart alliances*.

2. WHAT IS YOUR ASSESSMENT OF THE PROGRESS MADE IN BUSINESS-HIGHER EDUCATION ALLIANCES THUS FAR IN CANADA, UNITED STATES, AND MEXICO? HOW ARE THESE ALLIANCES UNDERSTOOD IN THE NATIONAL CONTEXT? ARE THEY A NATIONAL PRIORITY?

MEXICO (FERNANDEZ DE LA GARZA): The Mexican university tradition has created a culture in which many universities exist in isolation from business. Fortunately, this situation has been changing during recent years, in part as a result of a national change in perception about the role of business in society.

In the last ten years in Mexico the number of alliances between education and business has increased substantially. The scope of such alliances has also been enlarging. However, most of these alliances have been formed to solve short-term, specific problems.

Since the worsening of the financial crisis in 1994, businesses have not had many resources for such alliances, and government assistance has been limited. Thus progress in business higher education alliances has been restricted. But an awareness of the importance of these alliances has been increasing, especially within the universities. Creating alliances is now an important part of the agenda of Mexican higher education.

UNITED STATES (LANDRUM): Colleges, businesses, and government agencies across the nation have embraced partnerships. Usually the partnerships formed are designed to meet very specific goals. Perhaps the most common goal is to develop the workforce.

In 1996 the American Association of Community Colleges conducted a survey of more than 2400 employers on the subject of exemplary practices in workforce development. The final report, "Developing the World's Best Workforce: An Agenda for America's Community Colleges," emphasized the need for partnerships among colleges, businesses, and government. Nearly 75% of the exemplary practices highlighted in this report were partnerships between colleges and businesses to train the workforce.

The partnership model has not been promoted as a national priority in the U.S., but it has emerged as an important way to meet goals at the local and state levels. State and regional economic development organizations, in particular, have supported the partnership model because corporations are attracted to locate and expand in areas that have a large and well-trained workforce. A study in Canada that was reported in the *Toronto Globe* revealed that high tech companies planning to relocate or expand were most attracted by, first, a skilled workforce, second, the quality of life, and third, the proximity of a local university. Surprisingly, tax breaks were not much of a lure.

The Ministry of Education in Mexico is, I understand, interested in building closer connections between institutions of higher education and the business community. The plan is to have in place a workforce development system that will attract investment and business.

An important example of partnership in the U.S. is the link between Maricopa Community College District and the Universidad Autónoma de Baja California Sur. Their aim is to build a working relationship between the university, other local educational entities, the hotel/restaurant/hospitality industry, and government agencies of tourism and economic development. Collaboratively, these groups plan to develop educational programs to provide a local employment base to meet unmet workforce demands and to further the development of the hospitality industry. The university is also interested in participating in statewide economic development planning and in assisting with such issues as water resource conservation.

CANADA (SAMUELS): Research and innovation alliances have taken an important leap forward in Canada with the advent of new government-structured foundations. But even more alliances are needed, especially alliances that make the transition from school to work more effective.

The time is right. Higher education is currently faced with the challenge to connect people to the learning process in new and different ways. Employers are seeking new ways to train their employees with the assistance of higher education institutions. Alliances can meet both needs. Alliances can get more young people into the workforce, get them there more quickly, and ensure that they have the skills to stay there and be productive.

Alliances can help students understand the world of work. The most common alliances, such as co-op education and mentorships, are bridges between school and work. These alliances help students to make the right career choices, and they thus save money for students,

institutions, and employers. Collaboration among government, education, corporations, non-profit agencies, parents, and students *pays*.

Alliances are based on resource sharing. It is difficult for higher education institutions to keep pace with rapidly changing technologies and new expectations in the workplace. A smart alliance can pool technology supplied by business with expertise supplied by education. Schools can focus on what they do best, which is teaching skills such as critical thinking, logical analysis, synthesis, problem solving, and innovation. Business and industry can do what they do best, which is provide real-world, hands-on experience with the latest tools and techniques of the trade. Smart alliances can save money by pooling technology and expertise for the benefit of all.[1]

3. WHAT ARE THE DIFFERENT TYPES OF ALLIANCES YOU SEE FORMING IN YOUR COUNTRY?

MEXICO (FERNANDEZ DE LA GARZA): In Mexico, most alliances are between large companies with well-defined technological strategies and universities that provide postgraduate education, including advanced diploma programs, masters, and doctoral programs. Alliances often involve joint projects of technological research and development, and some are being developed between universities and groups of companies located in the same region.

Among some current alliances are:

- The alliance between "Celulosa y Papel" and the University of Guadalajara, which is a long-term strategic commitment to exchange technology, human resources, and knowledge.
- The project, "Celulosa y Derivados, S.A. (CYDSA)," designed to involve higher education institutions in promoting the development of technology and human resources for the textile industry.
- The partnership between "Resistol" and the School of Chemistry in the National Autonomous University of Mexico (UNAM).
- Specialized centers, such as "Centro de Diseño Mecánico" (the Center for Mechanical Design) in UNAM's School of Engineering and another in the National Polytechnic Institute.
- The Monterrey Institute of Technology and Higher Education (ITESM), which has participated in partnerships for more than 10 years. Through these partnerships, ITESM has provided consulting and technical assistance to the private and public sector and has, in turn, used what was learned from these activities to design its own curricula.

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[1] A full discussion of partnerships designed to encourage students to stay in school can be found in a 1997 C-HEF advisory document entitled "It Pays to Stay."

- The University of Morelos' agreements to support efforts of the state government and industrial associations.

- The University of Nuevo León and the Nuevo Leon Chamber of Transformation Industry's (CAINTRA) "School-Enterprise Plan" to provide support to medium and small businesses.

- The Xalapa Laboratory of Applied Technology (LATEX), which was established with the specific objective of strengthening the links between Veracruzana University and the industries of Veracruz.

In addition to these regional efforts, the National Autonomous University of Mexico (UNAM), established in 1991 a Center for Technological Innovation to promote partnerships between the university and the business sector. The "Coordinación de Vinculación Académica" was created in 1997 to coordinate all alliances of UNAM, the largest and the most diversified university in Mexico.

The Monterrey Institute of Technology and Higher Education (ITESM) has also established a multidisciplinary infrastructure to provide applied and industry-oriented research support for diverse enterprises and government agencies around the country. ITESM is one of the most successful examples of partnerships. Its success is based on the fact that it was created by a Monterrey industrial group that realized the need for highly qualified people to develop business and industry in that city. ITESM's entire administrative structure and operation is designed to encourage partnerships with business.

Despite the number of existing alliances, new mechanisms are needed to improve business-higher education relationships in Mexico. One encouraging trend is that university leaders are now focusing on how the university can act as an agent for change, both for business and society in general.

UNITED STATES (LANDRUM): There are three basic types of higher education-business partnerships in the United States:

- *A single company partners with a single institution of higher education.* For example, a partnership between Westell Technologies, Inc. and Northern Illinois University for just-in-time training of employees has enabled the company to grow by 30% in just three years.

- *An entire industry cooperates with an institution of higher education.* General Motors, Ford, and Chrysler, all automobile manufacturers, have partnerships with Glendale Community College of the Maricopa Community College District. The community college prepares automotive maintenance technicians; in return, the corporations and local dealerships sponsor students into the training programs, provide cooperative education placements, supply tools for the students, and keep the programs equipped with the latest technology. The Glendale program offers dedicated, laboratory classrooms, full-time faculty assignments, program oversight, and student recruitment services. In

addition, under contract with General Motors, GCC operates a GM Training Center that provides new product training for technicians employed by GM dealerships.

- *Multi-tiered partnerships of companies in an industry cluster including major companies and suppliers, a group of educational institutions, and several government organizations.* The Semiconductor Industry/Education Partnership involves six major wafer fabrication manufacturers, a handful of suppliers to the industry, six community colleges, three K-12 school districts, and two economic development organizations. The objective is to develop a pipeline of students into advanced technical programs at the colleges that will provide the 7,000 technicians needed by the industry over the next five years.

CANADA (SAMUELS): Some examples of business-education alliances that have been collected, reported, and rewarded by the Conference Board of Canada demonstrate the link between education and work:

- Ryerson Polytechnic University on Ontario has formed an alliance with the Strategic Alliance Division of the T. Eaton Company of Canada and 25 others to make retailing an attractive career option. The project enhances retail employees' on-the-job knowledge base by providing applied, current, relevant, and accessible education on issues and techniques within the retail sector. It is delivered through Ryerson's multi-media distance education system.

- Northlands College in Saskatchewan, along with 12 partners, has developed a multi-party training plan to overcome the academic and skill barriers to employment that northerners have historically faced. The training project, which provides access to more than 500 new jobs in the northern mining industry, focuses on apprenticeships and high-skilled technical and professional positions.

Other groups, such as the Canadian Youth Foundation (CYF), note that a business-education relationship is good practice if it involves private sector-sponsored employment initiatives to provide young Canadians with support, guidance, and exposure to the world of work. The CYF cites several examples of these smart alliances including support for young entrepreneurs, stay-in-school-programs, and on-the-job training.[2]

[2] Examples of these relationships are found in "25 Good Business Approaches to Youth Employment," available from the Canadian Youth Foundation. Their website is located at http://www.cyf.ca/index.html.

4. WHAT IS THE ROLE OF RESOURCE LEVERAGING IN THIS PROCESS (CREATION OF PARTNERSHIPS/ALLIANCES)?

MEXICO (FERNANDEZ DE LA GARZA): It is very important for partnerships/alliances to have a financial base provided either by the university or the government. Such resources are needed to initiate the work of the university and to promote an effective alliance. Once the resources are available, the most important factor in an alliance's success is regular, carefully designed interaction with the business partners and a commitment to specific projects.

UNITED STATES (LANDRUM): Resource leveraging in partnerships is very important to both the participating institution of higher education and the business organization. Business partners often provide resources such as student scholarships, faculty consultancies, student and faculty internships, equipment, and technology. The educational institutions, in turn, can provide faculty to teach critical aspects of workforce competence, as well as classrooms, labs, focused curriculum development, and research support.

Businesses can often negotiate more favorable contracts for training and research projects with their partner college or university because certain overhead costs are already covered by the institution. It is desirable for all partners to derive roughly equivalent benefits and for a "win-win" environment to prevail.

CANADA (SAMUELS): The need for resources is the primary driver in strategic alliances. Unfortunately, this economic focus can prove detrimental to the success of an alliance. Criteria vital to success include time, financial and human resources, communication, an appropriate decision-making process, support by senior people, shared values and ethics, compatible organizational cultures, and similar operating styles. It is important for every member of an alliance to take advantage of each other's overheads and infrastructure to leverage resources.

5. WHAT ARE THE USES OF TECHNOLOGY IN FURTHERING ALLIANCES?

MEXICO (FERNANDEZ DE LA GARZA): A major technology that furthers alliances is the Internet. It improves communication between alliance members, provides information, and opens access for universities to technical support. Through the Internet, institutions can learn about other alliances' experiences and can identify and reach consultants.

UNITED STATES (LANDRUM): Our past experience shows that technology has been essential in furthering alliances/partnerships, both within the U.S. and across borders. A partnership or alliance survives on the ability of its members to communicate effectively and quickly. Electronic mail enables alliances to do just that. It makes it possible for them to arrange

meetings, plan agendas, disseminate minutes from meetings, set up international visits, and co-write proposals, among other things. The Internet is also a way to share information on the alliance with any appropriate audience.

CANADA (SAMUELS): Technology allows for greater collaboration across borders and political boundaries. Because of the rapid developments in telecommunications and technology, new forms of alliances can now occur online and via virtual participation. New communications technologies have brought businesses and universities closer together, enabling them to explore new and better ways to work together.

Career Edge is one example of new technology at work in Canada. Career Edge is a private sector response to youth unemployment. It is designed to give high school and college graduates practical experience to make them more marketable. Students apply directly to a company through the Web. Once accepted, they become interns. Career Edge then serves as the interns' employer, with the participating company acting as host. Companies joining the program agree to set aside 1% of their payroll to fund up to 150 interns. Each intern is paid $15,000 annually. There is no government money involved. Each participating company is featured on the Career Edge Web Site. The program was launched in the fall of 1996, and, at present, over 70 of Canada's largest companies are participating. The long-term goal is to have 850 companies signed on by 1999 and 10,000 students participating. Career Edge is receiving rave reviews.

Two other successful programs are Your Home Office and Small Business. Conestoga College in Ontario and Global Lifeskills, Inc. have created these new programs. They provide a cutting-edge curriculum that enables aspiring entrepreneurs to learn current office technology and how to set up a home-based business. The programs can be completed either at the college or at home. They have already been replicated in both the United States and Mexico.

6. WHAT ARE THE CHARACTERISTICS OF INNOVATIVE, SUCCESSFUL, "SMART" ALLIANCES/PARTNERSHIP?

MEXICO (FERNANDEZ DE LA GARZA): The principal characteristics of innovative, successful, "smart" partnerships/alliances are:

- Personal trust between those in the university and those in the cooperating company(ies).
- A series of mutual interactions, including visits by participants to each other's place of business.
- An understanding on the part of company leaders of how important a successful partnerships/alliance could be for the company's technological or employee development.

UNITED STATES (LANDRUM): Partnering is a long-term, mutually beneficial relationship between two or more organizations. Based on an analysis of our experiences in initiating and furthering several partnerships, we have developed a core list of the salient factors for success:

- First, a successful partnership is established with the intent to be of truly mutual benefit to all the member organizations, with no "charity case" members. If the load of work or resource provision falls unevenly on some members, the "givers" may feel used and the "takers" may suffer loss of respect.

- The partnership must have a very clear focus, a well-defined objective, which all partners understand and support. For example, our Semiconductor Industry/Education Partnership has the clear objective "to recruit students into programs at the colleges that will prepare them to become technicians in the industry." When partners repeatedly spend meeting time trying to define what they want to accomplish, the relationship is not progressing satisfactorily.

- Successful partnerships are results-oriented, intent on achieving their defined objectives. Again using the Semiconductor Industry/Education Partnership as an example, the enrollments in the technical programs doubled in two years—from 900 students to 1800.

Business organizations can accomplish some things more easily than public higher education institutions, but in some instances, the reverse is true. Therefore, it is important for the partners to have realistic expectations of one another

In successful partnerships, members maintain mutual respect and commitment. They do what they say they will do and keep promises and confidences. And when an activity or event does not measure up to expectations, a well-functioning partnership can analyze the problem, correct miscues, and respond with a change in tactics.

CANADA (SAMUELS): In looking at the types of alliances that have been formed in Canada, a few common themes emerge to help define the criteria of a good or smart alliance. For example, The Conference Board of Canada annually awards honors to those alliances that:

- are helpful in improving Canada's competitiveness and quality of life
- develop and support the acquisition of foundation skills for employability
- demonstrate measurable goals
- are innovative and effective
- produce positive change and demonstrate success

- contribute to a lasting relationship among business, education and other stakeholders

- focus on readiness to learn, linking education to the world of work and lifelong learning.

7. SOME BUSINESS HIGHER EDUCATION ALLIANCES HAVE BEEN VERY UNPRODUCTIVE. WHAT WENT WRONG? WHAT DID WE LEARN?

MEXICO (FERNANDEZ DE LA GARZA): In Mexico, most of the partnerships/alliances that have not been successful were those that resulted from general agreements between universities and industrial chambers. In each case these alliances were established with only very general objectives. The alliances were often of a political nature, which meant they did not involve specific commitments or clear plans. Some unproductive alliances like these were established through some industrial chambers. However, there are other examples of arrangements made between universities and business through the chambers that have been very successful.

Unfortunately, in many cases universities have only started to feel confident that they can be influential agents for society—for example, by facilitating economic development. However, universities are learning that they can indeed be effective through participating in partnerships with commitments to specific goals and time frames as well as the capacity to act with limited resources.

Mexican businesses on the other hand, have been unaware of the potential benefits of effective partnerships with higher education. They have tended to see universities merely as short-term consultants rather than as potential partners in long-term alliances. As a result, business-higher education alliances have not generated an exchange of knowledge and experiences that can improve both the quality of higher education and the performance of the business sector.

CONACYT's Science and Technology Activities Report of 1996 states that, according to higher education institutions, the most important obstacles to the success of university business partnership are, in order of decreasing importance: lack of incentives; risk aversion; lack of government support; lack of knowledge about the benefits of partnerships; lack of trust in higher education institutions; and prejudices about the cost implied in the partnerships.

UNITED STATES (LANDRUM): Of course, there are the unsuccessful cases that no one brags about at conferences, and I must admit that I was once a party to a failed attempt at an industry/college partnership. With the benefit of hindsight, I know of two major problems that led to its demise.

- First, in developing what was intended to be a High Technology Council, we lacked a sufficiently clear purpose and focus. The advisory role we in higher education wanted from business was neither clear nor sufficiently important to

our industry members. As a result, they repeatedly questioned the council's purpose.

- A second problem arose when one member—in fact, the chair of the council—sought to use the group to support his goal of running for political office. When it became apparent that this situation made some members uncomfortable, we stopped scheduling meetings and let the council die.

CANADA (SAMUELS): The reasons for failure included a lack of leadership for the alliance, an inadequate understanding of the other partners before the alliance was formed, and insufficient time to form a productive relationship. In addition, the goals and desired outcomes of the alliance were not clear in the beginning. In some instances, the concept was promising, but the approach to implementation was not well thought out.

An example of a partnership that had great potential and made some wonderful strides in its day was The Canadian Centre for Learning Systems (CCLS). CCLS was a national centre of excellence dedicated to explore issues related to computer assisted learning. It was created over a decade ago and had eight partners including five educational institutions and three computer/technology companies. Unfortunately it failed as an alliance and never reached its full potential because it was never seen as a core priority by the partners. A full commitment was never made in either funds nor staff to make the organization function properly.

On the government side, alliances fail when artificially constructed government training programs are supply driven and not needs driven. Often they are politically motivated. This results in programs which do not respond to the needs of the marketplace which often results in cycles of dependency. Many of the participants in these programs become "perpetual participants."

II. WHAT IS NEEDED INSIDE HIGHER EDUCATION INSTITUTIONS AND BUSINESS?

8. WHAT SHOULD BOTH SECTORS DO TO BE SUCCESSFUL IN ALLIANCES?

MEXICO (FERNANDEZ DE LA GARZA): Both business and higher education should begin by finding ways to share their visions, identify mutual problems, and determine lines of action. It is also important for those participating in alliances to identify specific areas, such as scientific or technological fields, in which the businesses or industries are seeking support.

Partnering businesses must identify specific scientific or technological areas in which the company wants to receive support from higher education institutions. The next step is to define appropriate strategies. It is also important to establish criteria for success that acknowledge

that the results of an alliance can be broader than the solution to a specific problem and that they can include an expansion of the alliance itself.

It is essential to develop a "service culture" within partnering universities and a vision of their function that encompasses close, trusting, and effective links with business. On the university's side, there should be a minimum of bureaucracy and a maximum of flexibility. The quality of the interaction with business should be seen as important as concerns related to scientific or technological issues.

UNITED STATES (LANDRUM): Both sectors should be clear about their expectations before entering into an alliance or partnership. They must also assess their willingness and capacity to make the commitments necessary to carry out the partnership's objectives. Although it is certainly impossible to predict a year or two in advance all the resources that may be needed, an attitude of flexibility is very helpful. Moreover, partnering itself can stretch scarce resources.

CANADA (SAMUELS): Some alliances work and others don't. That's a fact of life. But what is it that makes the difference? Are there key elements that can be extracted from the existing stories about alliances and partnerships to point us in the right direction? Following are some suggestions for making alliances work:

1) *Awaken community interest.* In some cases, awakening community interest may require a common threat or a problem that partners must face. In other cases, a new challenge, such as technology, will create the community's interest.

2) *Find a leader.* No champion, no chance, no change. A leader will legitimize the alliance and build the constituency needed for its success.

3) *Define needs and opportunities.* Each partner must define its needs and opportunities. Each must be assured that individual as well as collective needs will be met.

4) *Learn from others.* Illustrate and learn from the success and failure of others. Develop broad principles upon which your alliance will be founded. But you must also understand your uniqueness.

5) *Bring interest and strategies together.* Define the parameters of your alliance and what will constitute success.

6) *Maintain momentum.* Inject energy into the alliance and keep it moving forward.

7) *Develop a plan of action.* Consult widely and secure buy-in. Articulate your goals and where you want to go, describe how to get there, and measure your progress regularly.

8) *Give the alliance life.* Empower the alliance to succeed and let the DNA develop. Understand and make known the alliance's benefits, including its shared vision, community spirit, and a team approach.

9) *Implement key goals early.* Start with early successes and broadcast them widely.

10) *Set benchmarks.* Define what really matters and make the benchmarks identify progress toward your goals.

11) *Conduct reality checks.* Solicit an outside point of view, develop best practices, and update your strategies constantly.

12) *Renew the system.* As an alliance is an entire system of interrelated pieces, it must all be renewed at once, not one piece at a time. Refresh the alliance with new, innovative, and creative ideas.

9. WHAT ARE THE ISSUES OF RELATIONSHIP MANAGEMENT OF PUBLIC/PRIVATE ALLIANCES? WHAT ABOUT FOR HIGHER EDUCATION INSTITUTIONS? HOW CAN WE PRESERVE THE AUTONOMY OF BOTH PLAYERS?

MEXICO (FERNANDEZ DE LA GARZA): It is important for business and higher education partners to respect each other's goals and recognize each other's limitations. The relationship must be flexible, so that neither side is limited in terms of its actions.

The most frequent complaints about threats to autonomy come from universities, where there are groups who see linkages with business as a potential loss of autonomy and freedom. However, when a relationship with business is based on mutual respect, the university maintains its freedom to work in accordance with its own interests and goals.

Business-higher education alliances can be designed not to limit but to enrich the autonomy and the capacity of the university.

UNITED STATES (LANDRUM): Partnership management can consume considerable personnel time. When the business members are from organizations that are competitors in the market place, it is usually the institutions of higher education that provide a neutral territory to allow the businesses to come together. As a result, many of the management tasks tend to fall to the college or university. It is therefore beneficial to structure the partnership early in the process so that it can eventually become mostly self-managing.

Many partnerships grow from informal relationships, so it is important to recognize when a more formal structure is needed. The initial definition of the partnership structure should make clear the degree of autonomy members have in speaking for and representing the partnership.

CANADA (SAMUELS): It is important to determine what is valued within both partner organizations. For example, what exactly does autonomy mean to all participating parties and what would be the consequences of autonomy that might be lost as a result of the alliance?

Partnerships are very time consuming. They develop on a personal basis with an advocate on either side. It is debatable whether this enthusiasm can be captured by a more formal bureaucratic relationship. Nothing can take the place of personal enthusiasm.

10. WHAT ARE THE PEOPLE SKILLS FOR ORGANIZING AND SUSTAINING ALLIANCES? HOW WELL IS YOUR COUNTRY DOING TO TRAIN STUDENTS AND FACULTY IN THIS AREA? WHAT ABOUT CROSS-CULTURAL AND LANGUAGE SKILLS? ARE YOUR INSTITUTIONS GUARANTEEING THE RELEVANCY OF EDUCATION TO WORK? HOW CAN THIS BE IMPROVED?

MEXICO (FERNANDEZ DE LA GARZA): In many cases, it has been important that the person who organized the alliance was someone with a leadership position. When the organizers for both industry and education were people with a well-defined status, they had a better chance for gaining support for joint activities. This has been the case as Mexican public universities have established alliances mainly with public institutions (such as Comisión Federal de Electricidad and Petróleos Mexicanos), usually developing research and degree programs to meet the needs of these public institutions.

Those who have organized successful alliances between universities and large private companies have also been in positions of leadership. Often they have graduated from the university and have remained close to it throughout their careers.

However, alliances between universities and small- and medium-sized industries have been much more difficult. Essential to promoting such alliances are personal contacts, a means to gain information quickly and efficiently, and a university culture that supports low-cost activities with small and medium-sized companies. The key person to develop alliances between universities and medium and small companies may be a field engineer who has broad technological and managerial experience and an excellent knowledge of the resources and operations of university groups.

We are now looking to education to be sensitive and responsive to industrial needs. I do not believe that students and professors should be trained to organize alliances. However, they should be prepared to help play a useful role in such alliances. Students should be given more opportunities to participate in real industrial projects, and professors should be knowledgeable about current problems, solutions, and trends. An interest in, commitment to, and appreciation for university-industry alliances are essential.

UNITED STATES (LANDRUM): Probably the important skills for partnering are teamwork, listening, and communications skills. But also needed to work in this area are an optimistic and

flexible attitude, the ability to establish relationships with partners, and the ability to think strategically and over the long term.

In fact, these people skills mirror the general skills and attitudes most employers list when asked what they are looking for in a desirable employee. We work very diligently to integrate these skills into the curricula of our career preparation programs in community colleges in the U.S. I am certain that we enjoy mixed success in this endeavor, and more recent work on identifying necessary skills for employment and on developing analytical assessment tools and measurement instruments is under way in the United States.

Cross-cultural and language skills for cross-border partnerships are very important, but sometimes the cultural gap between the business culture and the higher education culture is greater than that between educational institutions in a cross-border relationship. I am constantly fascinated by the similarities of issues, practices, traditions, ideas, and philosophies among educators around the world.

CANADA (SAMUELS): The skills for organizing and sustaining good alliances have been discussed in #8 above.

11. WHAT DEVELOPMENTS IN BUSINESS HAVE CAUSED THE CORPORATE WORLD TO SEEK ALLIANCES WITH HIGHER EDUCATION? WHAT ARE THE ADVANTAGES?

MEXICO (FERNANDEZ DE LA GARZA): The opening of Mexico to both foreign investment and products from all over the world has changed the business situation in Mexico. Foreign businesses now have ample opportunity to sell their products in Mexico. This means that Mexican enterprises can no longer offer to trade access to home markets for foreign technology. Mexican businesses now need to find new ways to acquire advanced technologies. One way to do this is to form alliances with universities within the country that are developing such technologies. Another way is to create alliances with foreign education and research institutions.

Besides the opening of Mexican markets, the business situation has been affected by the world trend toward outsourcing of staff functions. Businesses often look to universities for training, consultants, technical services, information, and research. When a university is able to meet these needs, the business can frequently realize significant cost-savings, as it is less expensive to obtain these services from a university in the region than from other suppliers or central laboratories.

Not having engaged in the direct development of services and technologies for business before, universities are often free of biases created by past experience; they are open to new approaches, ideas, and innovations. Alliances between business and education also benefit the educational institutions, of course. They enable the universities to understand current needs, trends, and advances in business. An alliance works to enlarge the university's vision.

UNITED STATES (LANDRUM): The contemporary business era is increasingly complex. An article in *Business Week* (26 August 1996) explained that global considerations, technology issues, increased pressures for consumer satisfaction, the need for efficient productivity, and expanded cost competition, along with other forces, have led major corporations to reconceive their circumstances. They are now strategizing in terms of "business ecosystems" and "co-evolution" to create "networks of relationships with customers, suppliers and rivals to gain greater competitive advantage." Such networks also include institutions of higher education.

One example of this business networking, or partnering, for a competitive advantage is in the airline industry. Airlines have formed "ecosystems" made up of the air carriers, the auto rental agencies, hotels, and bank credit card programs in order to cater to frequent flyers. Higher education also has its own natural "ecosystem," including a customer base of businesses interested in hiring trained workers. Education can also provide other services that can support corporations in terms of the development of both employees and products.

CANADA (SAMUELS): Successful smart alliances must start with recognizing a need on the part of both parties. The alliance should be able to address these needs if it is to be judged successful. Why would business need higher education, and why would higher education need business? Certainly not the duplicate what each does, but to strengthen common goals. One of these goals is to develop a strong set of skills in our graduates that will help them contribute to Canadian prosperity and its quality of life.

12. WHAT ARE THE TECHNICAL/WORKFORCE SHORTAGES AND ISSUES THAT MAKE IT NECESSARY TO CREATE THESE ALLIANCES?

MEXICO (FERNANDEZ DE LA GARZA): Outsourcing plays a part in these workforce issues; (see the answer to question 11). In addition, however, the increasingly complex and interdisciplinary nature of many technological developments also makes it difficult for businesses to have adequate internal capacity to solve technological problems in advanced scientific fields. This need for additional expertise encourages companies to be interested in working with universities that have the necessary scientific and technological knowledge.

UNITED STATES (LANDRUM): There is an acute shortage, world-wide, of engineers and technicians in advanced technologies, such as semiconductors, computer systems, and software. According to a study by the Information Technology Association of America, there is a shortage of 190,000 technicians in the U.S. in computer systems and software development. The Semiconductor Industry Association estimates the U.S. shortage of semiconductor technicians alone at 40,000 to 50,000. Worldwide shortages in these areas are likely to be two to three times as great.

Until less than five years ago, the semiconductor manufacturers hired high school graduates that they then trained at their sites. But corporations such as Intel, Motorola and others have not only added more technology to their products, they have also added technology to their manufacturing processes. These new processes require an employee with an in-depth knowledge of automated manufacturing and facility systems. These employees represent an increased requirement for learning, which the corporations now find much too lengthy (two years) and costly to manage as on-site training. Partnering, along with their competitors, with higher education institutions to grow technicians and engineers gives all the major manufacturers a share in creating a competitive edge and a cost advantage for the industry from which they all benefit.

CANADA (SAMUELS): Two major studies done by the Corporate-Higher Education Forum (C-HEF) in the early 1990s recognized the need for a new emphasis on skills to meet the needs of employers and the emerging marketplace.

- "Making the Match" was a report on human resource development, which determined that the skills most in demand were those in the shortest supply. Both academic and business leaders were called upon to create environments to develop innovation, creativity, leadership, conflict management, and risk-taking skills.

- "To Be Our Best: Learning for the Future," followed several years later. This C-HEF advisory was a call to action that, among other important issues, identified the core competencies needed by all students. These include the abilities to communicate, manage yourself, work with others, and cope with innovation and change.

The Conference Board of Canada has also entered the debate with its *Employability Skills Profile.* The Board notes that academic, personal management, and teamwork skills are the critical abilities required of the Canadian workforce. According to this profile, the crucial attributes needed to get and keep a job are the following: to communicate, think, and learn; to have positive attitudes and behaviors; to demonstrate responsibility and adaptability; and to be able to work with others.

III. REQUIRED FRAMEWORK SURROUNDING HIGHER EDUCATION AND BUSINESS FOR THESE PARTNERSHIPS TO OCCUR AND BE SUCCESSFUL

13. WHAT IS THE ROLE OF GOVERNMENT AGENCIES, AND HOW CAN THEY BE COORDINATED TO FOSTER SMART ALLIANCES? WHAT POLICIES WOULD ENABLE THE DEVELOPMENT OF ALLIANCES/PARTNERSHIPS AT FEDERAL, STATE, AND LOCAL LEVELS?

MEXICO (FERNANDEZ DE LA GARZA):

- *Education.* The Mexican Ministry of Education (SEP) is responsible for creating an environment that will promote links between business and higher education. It is the Education Ministry's task to be sure that all relevant organizations contribute to the development of these connections. The Ministry has the power to create—and fund—special programs designed to facilitate the linkages between business and education. This position is in charge of FOMES, a fund to modernize higher education, and also oversees PROMEP, a program that supports the graduate education of university professors and promotes studies and activities designed to create appropriate university infrastructures.

- *Economic development.* At the federal level, the Ministry of Industry and Commerce (SECOFI) guides and coordinates support for commercial and industrial activity. Such activity may include the formation of alliances. Other special sectors, such as agriculture, fishing, energy, mining, and transport, can also facilitate contact between business and the university. They can help generate financial support for the participation of faculty and students in company projects. State and municipal governments have responsibility for initiating and improving alliances between business and universities at the local level

- *Science and Technology.* The National Council of Science and Technology (CONACYT) has been—and will continue to be—active in the design and implementation of alliances between industry and higher education. CONACYT has both national and regional programs.

Good alliances between business and education can trigger important new research projects and programs leading to technological innovation; they can also help create effective infrastructures for postgraduate and specialized education.

UNITED STATES (LANDRUM): Government agencies have rather limited roles in the formation of partnerships between business and education. What they can do, however, is perform

facilitative activities, such as endorsing enabling legislation, securing funding, and supporting planning processes.

Some U.S. agencies can play a more active role. The U.S. Agency for International Development and the U.S. Information Agency can preferentially fund projects that include partnerships involving education, business, and government. In their joint programs, the National Science Foundation and CONACYT can require cross-border partnerships and relationships between business and higher education on both sides of the border.

At the state and local level, strategic plans for economic development can encourage partnerships, as, for instance, the Arizona Strategic Plan for Economic Development (ASPED) does.

CANADA (SAMUELS): Governments have a role to play in fostering or providing infrastructure to facilitate the creation of smarter alliances. Recent examples in Canada are matching programs in which a government will provide a portion of the funds to a particular educational institution if private sector partners can be found—especially private sector partners willing to work together with an institution to accomplish an agreed-on set of mutual goals.

The Federal Government of Canada has provided $800M for a Canadian Foundation for Innovation Fund. The mandate of the Foundation is to increase the capability of Canadian universities, colleges, hospitals, and other institutions to carry out important world-class scientific research and technology development. To implement this mission, the Foundation, in cooperation with funding partners, provides funding for research and development that will:

- support economic growth and job creation
- lead to improvements in health, environment and quality of life
- build capacity for innovation
- strengthen training for research careers for young Canadians
- attract and retain able research workers in Canada
- promote networks and collaboration among researchers
- ensure the optimal use of Canadian research infrastructure by promoting sharing within and among institutions.

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The Foundation is required to limit its contribution to approximately 40%, with the balance found from alliances with corporations, other government agencies, trust funds, voluntary organizations, and foundations or individuals.

The Foundation encourages prospective partners, particularly corporations and voluntary agencies, to take an active role in seeking out opportunities for investment in research infrastructure. There is also recognition that there may be important opportunities for corporations and others to join with the Foundation in building research capability to match their various interests.[3]

Another example of a government-initiated alliance is the Intellectual Infrastructure Partnership Program (IIPP) in Alberta. This is a provincial initiative designed to increase research excellence and competitiveness of Alberta Universities and research hospitals by investing strategically in their research infrastructure. To achieve this objective, the IIPP will encourage the private sector to make significant financial commitments to the cost of projects. The Provincial Government expects to spend $15M a year over a three-year period beginning in 1997-98.

This is a difficult issue in Canada since different governments have certain role to play in education with provincial governments owning the lion's share of the education authority.

However, as noted above, it is in the area of policy that governments can lead the most. In a recently approved government policy statement the notion of encouraging alliances to solve the youth unemployment problem was raised. It stated,

> "All Canadians have a stake in meeting this challenge successfully. No single sector or society nor any one level of government has all the answers. We must all contribute, each in our own areas of competency, to meet the challenge we have set for ourselves. The Government welcomes the action being taken by the private sector, through initiatives such as Career Edge and the Corporate Council on Youth in the Economy, and encourages the private sector to do more. The Government is committed to work with other governments, the private sector, communities and individual Canadians to help equip young people for the future."

14. HOW CAN PROFESSIONAL ASSOCIATIONS ACT TO IDENTIFY AND PROMOTE OPPORTUNITIES FOR ALLIANCES BETWEEN UNIVERSITIES AND BUSINESS? ARE THERE NGOS AND COMMUNITY-BASED ORGANIZATIONS THAT COULD PARTICIPATE IN PROMOTING AND CREATING A "CULTURE OF SMART ALLIANCES"? WHAT ROLE COULD THEY PLAY?

MEXICO (FERNANDEZ DE LA GARZA): Professional organizations are in a strong position to promote alliances since they normally bring university researchers and professors together with

[3] More information about these alliances can be found at http://www.innovation.ca.

industry engineers, scientists, and managers. To do so, however, they must not only be committed to such alliances but also organized to promote them. Professional organizations have the flexibility and freedom to play an important role. They can arrange conferences, workshops, fairs, and publications. They can function synergistically, pulling together specialists from several sectors to address a particular issue.

There are some promising examples in Mexico. Professional associations in the fields of electrical and electronic, chemical, and automotive engineering have already played an important role in promoting successful university-industry alliances.

Using an inter-institutional, multi-disciplinary, multi-level approach, NGOs and community organizations can be very effective in identifying opportunities for collaboration and in suggesting lines of action. To carry out the role of promoting alliances, NGOs and community organizations themselves need increased information and support.

UNITED STATES (LANDRUM): Both business and higher education professional associations can help promote and encourage partnership development in several ways. The associations can feature presentations on building partnerships in their newsletters, conferences, and seminars. They can help with "matchmaking" by introducing interested potential partners to each other. Joint conferences of business and higher education associations could be arranged. For example, there could be a meeting of the National Alliance of Business, the American Council on Education, and/or the American Association of Community Colleges. By holding such conferences, the associations would not only be furthering the development of partnerships but also actually modeling a partnership philosophy.

CANADA: See question #17 where this is answered and a full illustration is given.

15. WHAT MECHANISMS ARE NEEDED TO MEASURE THE IMPACT OF SMART ALLIANCES, AND WHICH PARAMETERS SHOULD BE CONSIDERED? WHAT IS THE CURRENT SITUATION IN CANADA, THE UNITED STATES, AND MEXICO? DO THESE RESEARCH AND STUDY GROUPS EXIST? WHAT IMPACT HAVE THEY HAD SO FAR IN THE DEFINITION, PROMOTION, AND EVALUATION OF SMART ALLIANCES?

MEXICO (FERNANDEZ DE LA GARZA): There is a growing trend toward evaluating alliances. The evaluations are being conducted partly in numeric terms, for example, by counting the number of courses or laboratory services developed. In addition, evaluators are beginning to measure the results of alliances by looking for real improvements, for example, by analyzing such things as the increase in production and the creation of jobs. It is not easy to do this kind of evaluation. It requires a clear set of criteria, well-prepared questionnaires, field interviews, and ways to integrate all the information gathered. This kind of evaluation is crucial, however,

because it provides an objective measure that makes possible a rational allocation of future resources.

Government agencies are aware of the need for careful, analytical evaluation. They are prepared to fund programs to develop criteria, methodologies, and mechanisms to do this kind of quantitative and analytic evaluation of alliances.

UNITED STATES (LANDRUM): My research indicates that relatively little is being done to evaluate the effects of alliances in the U.S. One study that is useful, from a limited perspective, is a survey report published by the American Association of Community Colleges. In this 1997 report, "Developing the World's Best Workforce," 75% of the responding colleges cited a partnership as the part of their workforce training that was most valuable. The study found that, "according to deans/directors," partnerships "lead to innovation, increased effectiveness, and improved efficiency." This report is especially useful in estimating the impact of partnerships on workforce training, but of course there are other aspects of partnerships that also need to be analyzed and evaluated.

CANADA (SAMUELS): Except for some work done by the Conference Board of Canada, there has been little evaluative research in this field. This is an area that is full of opportunity for researchers with an interest in business-higher education alliances.

Individual members of an alliance will, of course, have their own measures of success. When the alliance no longer meets their needs, they may make their own assessment of further possibilities and, if they see none, will stop participating.

16. WHERE WILL/COULD THESE ALLIANCES TAKE US IN THE FUTURE? HOW DO WE EXPAND AND CONNECT CURRENT EFFORTS—OFTEN ISOLATED, PIECEMEAL APPROACHES—AND BUILD MORE INTEGRATED COLLABORATION WHICH HAS THE POWER TO TRANSFORM SOCIETIES AND COMMUNITIES?

MEXICO (FERNANDEZ DE LA GARZA): The potential power of alliances is immense. Alliances may improve and transform both the work place and the university, and in so doing change society itself.

Alliances could improve the education of engineers and applied scientists, increasing their knowledge, their practical experience, their confidence, their ability to communicate, their capacity for teamwork, their practical problem-solving, and, of course, their skill at interacting with businesses.

Alliances could improve opportunities for students, increasing their ability to find good jobs.

Alliances could improve universities in the following ways:

- Teachers will be exposed to a variety of practical problems, which they can guide their students to solve.
- Universities will enlarge their existing laboratories, knowledge networks, and technology infrastructure, enabling them to connect with research centers, professional associations, and government projects.
- Universities will improve their interaction with federal, state, and local agencies, as well as the business community.
- Universities will better serve community groups, government agencies, and private businesses, and in turn, the universities themselves will be more likely to receive support.

Finally, alliances should improve businesses themselves, enabling them to be more efficient, more productive, and more competitive. Such changes will benefit the society as a whole, as jobs expand, tax revenues grow, and the GNP increases.

UNITED STATES (LANDRUM): The scope of this question is vast and therefore daunting. At a recent conference Gary Tooker, Chairman of the Board of Motorola, Inc., said in his keynote address: "We need to think globally and act locally." The same principle seems to apply to the development of partnerships. While we need to consider the power and impact of partnerships on the global scale, we need to create them locally. We must build partnerships that are rooted in and critical to our local communities. Such partnerships will inevitably strengthen the nation's economic health and at the same time contribute to global prosperity.

The potential benefits of partnerships, both nationally and internationally, seem to be enormous. Partnerships may also solve some of the special problems that are emerging with new technology. One especially troubling one is worth considering in detail. As businesses develop new and specialized knowledge, they of course retain control of it, often through copyright for their new systems. They then charge fees, sometimes quite high ones, for the use of their materials in education. This practice is profitable for corporations, but it hinders educational institutions because they cannot always afford to pay the fees.

Although Microsoft is by no means the only corporation engaged in this kind of control of new knowledge, it provides a concrete example. Microsoft owns the learning materials, certifying tests, and final certificates that authorize one to be a Microsoft Solutions Technician, Microsoft Administrator, or Microsoft Network Engineer, eligible to manage, maintain, or trouble-shoot on Microsoft-installed network systems.

An instructor cannot teach the systems unless he/she is first certified by Microsoft. The cost to be certified is about $8,000 USD, beyond the means of many educators and their students. Ironically, then, while higher education is thus sometimes prohibited from providing needed

training, the industry as a whole suffers from a shortage of qualified technicians. Such problems pose real challenges; partnerships may be one way to meet them.

CANADA (SAMUELS): The potential is infinite. A forum for discussing such future possibilities on a continuing basis would be valuable. Using emerging technologies could also help those interested in this topic keep connected.

17. WHAT ROLE CAN BUSINESS-HIGHER EDUCATION FORUMS PLAY IN PROMOTING NATIONAL AND INTERNATIONAL COLLABORATIONS ON THIS FRONT?

MEXICO (FERNANDEZ DE LA GARZA): Business-higher education forums can play several key roles:

- They can promote awareness in government, industry, and universities of the critical importance of alliances.
- They can assist in the development of mechanisms and programs designed to create alliances.
- They can gather and disseminate information, both national and international, on alliances.

UNITED STATES (LANDRUM): This question is answered in #14.

CANADA (SAMUELS): One example of a forum that fosters the notion of alliances is the Corporate-Higher Education Forum in Canada (C-HEF). Sister forums exist in the U.S., Australia, and Japan.

C-HEF is an example of collaborative thinking. It has shown leadership in the national debate and has promoted dialogue and mutual understanding between business and academic leaders since it was conceived in 1981. C-HEF has sponsored and published numerous papers and books that promote new, creative, and better ways to serve Canada.

From its outset, C-HEF recognized the value of bringing the business and higher education communities together in smart alliances.

Businesses realized that economic forces were challenging Canada and its workforce to be more competitive. New skills and new processes were demanded of graduates. While in the past Canada relied heavily on its natural resources, technology, and new uses of information, there was an eventual recognition that Canada needed to mobilize its intellectual and financial

resources more rapidly. In short, economic forces were drawing the corporate and academic communities closer together.

For the corporate community, these economic forces meant a need for access to leading- edge knowledge, products, processes, and services in order to compete in world markets. Not only did corporations need highly qualified graduates, they also needed access to continuing education in many forms to upgrade the skills of existing employees. Research and development were becoming of greater interest to corporate Canada.

Canada as a whole has benefited from the synergy of the corporate-academic effort. C-HEF has built that relationship through a series of projects and advisory papers done under its auspices, including the following:

- Partnership for Growth—showed the scope of opportunities for cooperation and new activities that could involve business and academia working together.
- Spending Smarter—focused on corporate-higher education cooperation in research and development.
- Making the Match—investigated the education and skills acquisition of university graduates.
- From Patrons to Partners—examined the alliances formed when higher education sought corporate support and recommended a radically different environment for corporate philanthropy.
- Going Global—identified Canada's economic future as connected with the success of business in international trade and world markets and recognized that well-educated and highly qualified people would be in ever-increasing demand.
- Directory to International Business Education in Canada—focused on educational initiatives related to international business.
- Learning for the Future—framed the discussion for a better understanding of the character and quality of education in Canada today.
- Learning Goals for K-12—recommended a set of goals for student learning to motivate and guide learning in Canadian schools.
- Good Connections—focused on functioning in the age of digital connectivity, the business case for technology-mediated education, and the future of higher education in a digital world. Good Connections was both a workbook and an assembly.
- It Pays to Stay—an advisory to government, educational institutions, business and individuals that focused on the rationale for staying in school, why it pays off, new ways to stay, and partnerships for staying.

- Get Smart Canada—an assembly that examined the concept of smart community and the alliances that are needed for such communities to prosper.[4]

18. CONSIDERING NAFTA AND THE GROWING GLOBAL ECONOMY, WHAT ARE THE PROSPECTS FOR CROSS-BORDER COLLABORATION IN THE BINATIONAL AND TRINATIONAL SENSE? WHAT IS ALREADY BEING DONE? WHAT AREAS STILL NEED TO BE EXPLORED?

MEXICO (FERNANDEZ DE LA GARZA): Collaboration among Canada, the United States, and Mexico needs to be improved. Several things need to be addressed. First, there should be better knowledge of existing programs. Second, there should be a joint effort to improve weak programs. Third, there should be new and broader inter-country agreements aimed at improving present alliances and promoting future ones. All these efforts require continuous mutual cooperation and on-going attention.

UNITED STATES (LANDRUM): The opportunities for cross-border collaborations are many. Partnerships involving both higher education institutions and businesses across borders are especially attractive. Institutions of higher education that already have a partnership in Canada, the U.S., or Mexico appeal to businesses seeking to expand into one of these countries, since such institutions offer ready information and access to that country. A case in point is the joint grant relationship of the Maricopa Community College District with the Universidad Autónoma de Baja California Sur. Seeing the possibility of building a business-to-business relationship in the Mexican resort area, both the Salt River Project, a major utility in the Phoenix area, and the Hyatt Hotel chain have been eager to join in the already established alliance.

Economic development organizations seeking foreign investment opportunities and export markets often look to higher education for assistance. Such organizations hope that higher education can: a) provide support for new companies locating in their communities; b) offer training in foreign business and cultural practices; and c) help develop connections in NAFTA partner countries.

I believe that the Partnerships for Development projects supported by the Association Liaison Office, the American Council of Education, and the American Association of Community Colleges, among others, are creating the foundation on which future partnerships will be built. While these are small grant projects, they establish models of partnership which communities can replicate and expand.

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[4] More information about C-HEF and its work can be found at http://www.work.org/C-HEF/

CANADA (SAMUELS): Forums such as CONAHEC are a good place to begin.

There are countless links among institutions in our various countries that involve student and faculty exchanges and collaborative research. It is important to learn from "best practices" in every case. We definitely do not need a bureaucratic structure to form alliances. These are fine for sharing information and ideas, but personal passion is the key to success.

ABOUT THE AUTHORS

GUILLERMO FERNANDEZ DE LA GARZA is Executive Director of the United States-Mexico Foundation for Science. Fernandez de la Garza graduated from UNAM in electrical and mechanical engineering and physics and holds a master's degrees in nuclear engineering from the National Polytechnical Institute and a master's in engineering economic systems from Stanford University.

His professional career includes executive responsibilities with the Mexican Government Electric Utility (CFE), the National Council for Science and Technology (CONACYT), the Mexican Electric Research Institute where he was Executive Director, and the Mexican National Commission of Energy Efficiency (CONAE) where he served as Technical Secretary. Fernandez de la Garza has been active in several Mexican and international professional organizations such as the IEEE (Institute for Electronic and Electronical Engineers) and on the advisory councils of UNESCO, UNIDO (United Nations Industrial Development Organization) and the IAEA (International Atomic Energy Agency).

BERTHA LANDRUM is Director of Business and Workforce Development with the Maricopa Community College District (MCCD) in the Greater Phoenix area of Arizona. Landrum has been with the MCCD since 1965 and has participated in its growth from 6,000 students in 1965 to over 96,000 in 1997.

The office of Business and Workforce Development works with MCCD's 10 colleges and skill center to develop certificate and Associate of Applied Science degree programs to prepare the local citizens for employment in 250 career opportunities. The Office also works closely with economic development organizations to attract new companies to the area or assist local companies to expand and thereby create more quality employment opportunities and expand the base of wealth in the area. A major activity of the office is the formation of partnership arrangements that are (1) contract-based to serve specialized training needs of a corporation; examples are partnerships with Motorola University, John Deere, Inc. and General Motors Training Division, or (2) an industry cluster that centers on specialized, critical and unique workforce development needs.

The office is particularly interested in developing international projects/partnerships that grow upon those that MCCD has already developed with institutions of higher education in Mexico and organizations in Chengdu and Jianmen, China.

Landrum received her B.S. in Psychology from the University of Minnesota and a Master's in Educational Psychology from Arizona State University.

BARBARA A. SAMUELS' background is in education, evaluation, planning and information design. She is currently the Director of Planning at The University of Calgary. Her work involves academic planning at the senior administrative level.

Prior to her work at The University of Calgary which began in 1983, she held a number of positions with the Calgary Board of Education and was the founding Executive Director of the Canadian Centre for Learning Systems.

Samuels has written extensively on topics such as understanding culture, technology, change, performance and accountability and strategic planning. Two of her recent publications include a textbook for junior high school students entitled "Multiculturalism in Canada: Images and Issues" and an advisory to government, educational institutions, parents and students on why it pays to stay in school, new ways to stay, and partnerships for staying. "It Pays to Stay" was written under the auspices of the Corporate-Higher Education Forum.

Samuels has served on numerous committees and is currently the chair of the Universities Coordinating Council on Performance Indicators and the treasurer of knowledge@work, a virtual organization of informed volunteers who are exploring the impact of the "information age" on society. She holds a bachelor's of science from the University of Calgary, and a master's in education and a doctorate from the University of Oregon.

APPENDIX A

"TRAINING PARTNERSHIP YIELDS BUSINESS RESULTS FOR GROWING COMPANY"

From *Work Force Economics*, June 1997, National Alliance of Business
Reprinted courtesy of National Alliance of Business

How does a rapidly growing company that manufactures products for a fast-paced, chaotic industry keep pace with day-to-day operations, much less continuous improvements? One method used by Westell Technologies, Inc. is to rely on assistance from a training partner, Northern Illinois University's Business and Industry Services Division (NIU-BIS).

Westell, located in Aurora, Ill., designs, manufactures, markets and services telecommunications equipment worldwide. The company was founded in 190 to supply niche products to the regional Bell operating companies. Since 1993, Westell also has supplied Asymmetric Digital Subscriber Line (ADSL) systems, which will allow telephone companies to provide high-speed, interactive multimedia over existing cooper wire.

Westell's Training and Development Challenges

During the past three years, Westell has experienced rapid changes, including a 30 percent increase in the number of employees (Westell now employs 581 people and has moved to a new, more spacious facility). In November 1996, the company became publicly traded. Then, the deregulation of the U.S. telecommunications industry in 1996 altered the way Westell's customers operate their businesses. And, during this same time frame, Westell increased its export markets to 62 countries, compared to 30 in 1994.

With the additional strain on the company's internal training and development resources, Westell's solution was to partner with outside vendors who could help the company quickly determine priorities and deliver training programs.

"The benefit of partnering with NIU is that training is delivered on a just-in-time basis, the content is continually updated, the quality of the programs is excellent and we have been able to deliver on a broad scope of topics," says Terry Conway, Westell's training manager. "Our time internally has been freed up to focus on the performance needs of the business and simply coordinate with NIU to deliver the programs."

Training and Development Programs

Using a grant from the Illinois Department of Commerce and Community Affairs, in cooperation with the Illinois Manufacturers Association, NEU has developed programs in English as a Second Language, production, coaching and teaming, conflict resolution and quality with input from production workers, production line supervisors and internal training staff.

The manager of manufacturing cites the conflict resolution training as having a significant impact on business results. "We spend our time now really communicating about production issues and have learned specific tools for focusing on the work that needs to be done

rather than the confusion that can result from a constantly changing environment."

Another highlight of the skill-development program is the continuous-improvement team training. A team of production workers, in collaboration with a manufacturing engineer, redesigned the stockroom and raw materials preparation areas. The team learned how to use quality tools, which allowed them to collect and analyze data, then make recommendations for improvement. "After working at Westell for almost seven years, I was able to really think about doing things differently. It felt good to recommend improvements to the other workers and my supervisor," says a member of this team.

Business Results

The returns on the training this past year are equally remarkable. Training, in combination with process-improvement efforts, led to:

- Increased productivity. During the past year, production output has increased by 7 percent.
- Improved product quality. Warranty claims have decreased by 20 percent. Process defect rates have declined by almost 45 percent.
- Improved customer satisfaction. On-time deliveries have improved by 4 percent, even with the increased international shipments.
- Reduced training cost per hour. Efficiency is improved when outside vendors perform training. And, training programs delivered by NIU versus internal resources cost 64 percent less.

For more information, contact Terry Conway, manager of corporate training and development, at 630/375-4164.

APPENDIX B

"PUBLIC/PRIVATE PARTNERSHIP MEETS HIGH TECH DEMANDS"

BY BERTHA LANDRUM

Spring 1996, Vol. 7, Issue 1
From "Workplace", National Council for Occupational Education
Reprinted with permission from author.

If you watched a movie last night on your VCR or opened a garage door automatically this morning or worked at a computer today—you did it with the help of a memory chip.

The rapidly increasing demand for these tiny silicon chips, many manufactured in Greater Phoenix, will create more than 5,000 new high-technology jobs here in Arizona in the next five years. To encourage a steady supply of qualified employees, the Maricopa Community Colleges have developed unique curricula to provide training.

"We have about 1,000 students in the academic pipeline now, but we know that we will need many more," said Bertha Landrum, Director of Business and Workforce Development for Maricopa Community Colleges. "We want to keep enrollment increasing at a steady rate so our supply can meet high-technology's demand."

The colleges, with the direction from local high-technology companies, are customizing programs to prepare students for these jobs; and corporate scholarships and internships are adding value to the venture. Positions, with $20,000 to $50,000 annual salaries, are attractive to displaced middle managers willing to retrain as well as to recent high school graduates entering the workforce for the first time.

Both groups are targeted by the two-year programs designed to produce semi-conductor process technicians, circuit design technicians, and facilities maintenance technicians—all essential to the six new fabricating plants currently being built in the Phoenix area. With one of these associate degrees, students leaning toward technology, who want to get into the workforce sooner rather than later, can position themselves to take advantage of the availability of these well-paying openings.

Career education open houses—one in June and another in October—hosted by a partnership including Maricopa Community Colleges, Arizona Central College, the Greater Phoenix Economic Council, Air Products & Chemicals, Inc., Intel Corporation, Johnson Controls, Inc., Microchip Technology, Inc., Motorola, Inc., and SGS Thomson Micro-electronics, Inc., attracted almost 4,000 interested people, some from as far away as Southern California. Corporate participation brought real-life employees from cutting-edge silicon wafer fabricating plants,

who could speak candidly about how to make computer chips and what it takes to succeed in these positions.

Because chip manufacturing requires strict contamination prevention which controls access to plants—as well as process confidentiality—a hidden job market exists, and most people do not know how the tiny chips are made. The open houses, including a seminar for career guidance counselors and high school teachers, provide the opportunity to strip away some of the mystique.

Also helpful is a summer faculty program, created by Intel for college instructors and high school teachers. These ten-week, on-the job experiences give teachers the tools to make theory come alive when preparing students for new technician positions.

Instructors see semiconductor manufacturing technicians as a new breed of worker. These technicians must know how to evaluate problems and how to take corrective action when warranted. The contaminate-free "clean room" work environment requires both independent and team activities in all phases of semiconductor production.

Graduates of these programs, therefore, are trained to do basic preventive maintenance on equipment and first-order troubleshooting on equipment and processes. The curriculum is strong in math, science, and communications skills and prepares associate degree graduates for advancement to equipment and process technicians with minimal additional training on the job.

As the nation's second largest system of its kind and Arizona's largest provider of job training for new and expanding companies, the Maricopa Community Colleges form a vital link in this dynamic partnership, having provided career education for more than 250,000 employees since 1982. Instructors include 950 full-time faculty, supplemented by 2,474 part-time instructors, experts from the community who are specialists in their respective fields. At the end of this academic year, the ten colleges will aware more than 3,100 associate degrees and 2,400 certificates of completion in occupational programs.

Six wafer fabrication facilities, or "fabs" as they are known, are being built at once in Greater Phoenix to make the silicon wafers from which chips are manufactured. Intel's 1.5 million square-foot plant in Chandler is one of the largest manufacturing facilities currently under construction in the nation and will employ 2,000 people. Other manufacturing facilities will add another 3,000 positions. As many as 120,000 such positions are anticipated worldwide.

Semiconductors have been a growth industry in this state since the 1950s, but the number of positions becoming available so rapidly is unprecedented. Arizona Department of Commerce figures show that the high-tech industry accounts for nearly half of the 200,000 manufacturing jobs in the state.

This model high-technology partnership parallels the tenets of Arizona's School-to-Work Plan aimed at the student for whom a four-year college experience is not desired or an available option. By the close of this century less than 30 percent of U.S. jobs will require a bachelor's degree, and the technical or semi-professional job market will be demanding 65 percent of the workforce.

Maricopa Community Colleges and the Arizona School-to-Work Division are dedicated to redefining learning, developing more integrated curricula, involving employers as partners in the learning process, and providing work-based learning opportunities for the workforce in the future. As needs evolve they want to have new learning procedures in place to prepare students for a wider range of occupations and educational opportunities—greatly increasing their chances for being employed in good jobs after graduation.

It's a new way of thinking for many, but the ripple effect of a high-quality, employed working-age population is a win-win situation for everyone.